



UNIVERSITY OF  
PORTSMOUTH

# BREAST HEALTH NEWS

Research Group in Breast Health  
University of Portsmouth  
Issue 9 - January 2021

WELCOME TO THE 9TH EDITION OF THE RESEARCH GROUP IN BREAST HEALTH NEWSLETTER

The group, based at the University of Portsmouth and led by Professor Joanna Wakefield-Scurr, is internationally renowned for conducting pioneering fundamental and applied research into this important aspect of women's health.

Despite the many challenges in 2020, our Research Group still had lots to celebrate. Our RGBH team member Atefeh Omrani completed her PhD, congratulations Dr Omrani! Our researcher Dr Amy Sanchez gave birth to baby Theo. We also welcomed a new PhD student Emily Paines and welcomed back Professor Joanna Wakefield-Scurr from maternity leave.



## BREAST SUPPORT FOR FEMALE ARMY RECRUITS FEMALE RECRUITS REQUIRE A BREAST SUPPORT GARMENT THAT CAN SOLVE BRA DISCOMFORT ISSUES

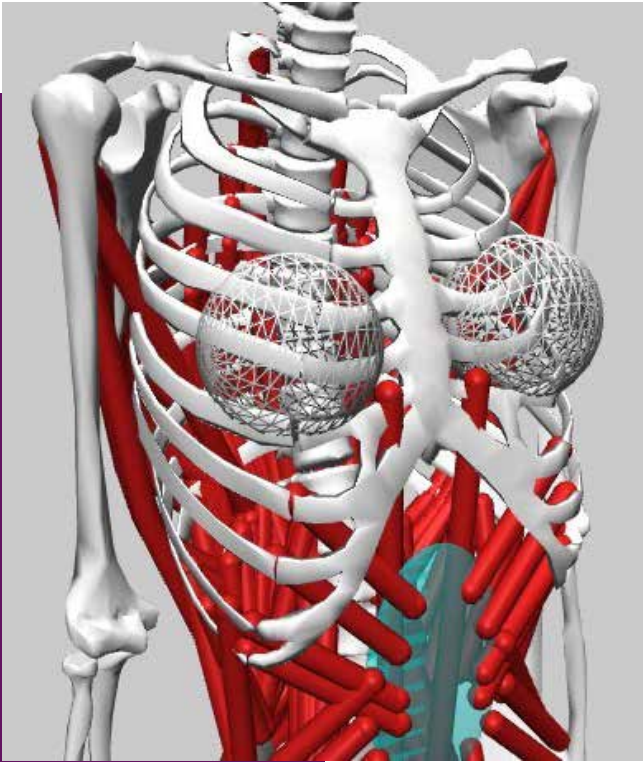
High support sports bras have historically been designed for short duration high-intensity activities (such as running) and therefore it is not known whether these sports bras are suitable for longer duration occupational tasks.

Over the past three years Dr Jenny Burbage, in collaboration with the HQ Army Recruiting & Initial Training Command, has undertaken preliminary investigations into the incidence of training-related breast health issues and sports bra usage in British Army female recruits. Due to these initial studies the Army have implemented a sports bra fit and issue service for female recruits, which is a great initiative and a step forwards for female recruit health. However, despite providing a well-fitted sports bra to female recruits, the number of bra discomfort issues remain high, which may ultimately affect an individual's capability to undertake basic training. It is of great operational importance that further research is carried out to investigate the needs of female recruits and whether there are sports bra products currently on the market that are suitable for basic training. This research has the potential not only to impact on the current sports bra fit and issue service for basic training, but has wider implications for all female military personnel.

Dr Jenny Burbage, with support from Dr Gemma Milligan, were successfully awarded funding to lead a 3 year project to optimise the breast support for female Army recruits from October 2020. Therefore, we welcome a new full-time PhD student, Emily Paines, to the Research Group. Watch this space for the results of this exciting collaboration!



## USING A COMPUTER MODEL TO UNDERSTAND HOW BREAST MASS AFFECTS LOADING ON THE HUMAN BODY



Dr Chris Mills recently presented data at the International Society of Biomechanics in Sports 2020, in which evidence was used to illustrate that female specific computer models are important to accurately estimate the internal loading experienced by women during exercise.

Our research in the area of breast health has continued to develop and has recently started to use computer modelling approaches to answer important research questions that are not easily addressed in a laboratory. Dr Mills has created a novel model of the female torso and breasts to highlight how the breast mass and their position on the chest wall can affect the loading on the spine. The work used a combination of medical imaging and complex computer modelling techniques to simulate the effect of the breast during running. Results concluded that neglecting the breasts and their position in female computer models may cause a misrepresentation of the muscular demands, by up to **18%**.

These important findings have multiple applications such as the effects of breast augmentation as well as the understanding of potential injury mechanisms in a variety of sports and activities.

Mills, C., Jones, M. Changes in lumbar joint moments using a female specific torso model during running. In Proceedings of the International Society of Biomechanics in Sports, July 2020, Liverpool, UK. (Vol 28, Issue 1, article 13).

## SPORTS BRAS FOR OUR ELITE FEMALE ATHLETES

We are continuing to work in collaboration with the English Institute of Sport and Clover Group Int. Ltd. Hong Kong (lingerie manufacturer) on the SmarTHER campaign supporting Britain's elite female athletes.

Following the success of our educational workshops in 2019, we identified a small number of athletes who had significant challenges relating to their sports bras. Along with Emily Roberts, Senior Innovation Lead for Clover Group Int. we worked with these athletes to develop bespoke bras that would address their specific needs. These bras included:

- a high support bra with a GPS pouch.
- a streamline sports bra.
- a bra to help arm positioning.
- a bra that improves shoulder movement and posture.

During the 2019 workshops we identified a general lack of bra and breast education in elite athletes, particularly relating to bra style and bra fit. To address this, the Clover Group Int. R&D team, lead by Sigi Rabinowicz, developed a new range of sports bras for the British athletes. Athletes were invited to attend fitting days around the UK, where they were given the opportunity to try the new sports bras, get advice from our researchers on what style would suit their body and their sport, and ensure they were wearing the correct size. So far, we have fitted 98 able bodied and para athletes from 14 different sports. The bra fitting sessions and the new Clover sports bra range got an excellent reception from the athletes. We hope that the athletes left not only with a new bra but also a better understanding of bra style and bra fit, and that this knowledge will help them select the best bra for them in the future.





## TREASURE YOUR CHEST

### BREAST EDUCATION WITH ADOLESCENT GIRLS

Following extensive consultation with girls, teachers and schools, we have produced a 50-minute 'Treasure Your Chest' presentation and lesson plan to help teach adolescent girls about breast health. We have since conducted extensive evaluation of our resources and have recruited over 750 schoolgirls across two control schools and two intervention schools. Following delivery of the breast education sessions, we identified significant improvements in girls knowledge and attitudes towards breasts, and their engagement with positive breast habits. These improvements were sustained six months later. The girls described the session as "informative" and said it made them "feel less embarrassed" about their breasts. They also reported wanting to exercise more and to change their bra purchasing and bra wearing habits. These novel findings provide insight into the benefits of teaching girls about breasts and can be used to inform effective breast education in schools.

#### Treasure Your Chest website launch

We recently launched our 'Treasure Your Chest' website which provides quick access to our breast education resources. These resources are aimed at 11-14 year old girls and are free to download for non-commercial use. Whether you are a teacher, school nurse, sports coach, or a parent/guardian we have designed these resources to support you to deliver high quality breast education and create a positive environment where girls can ask questions about breasts, bras and everything in between. Visit our site here: [treasureyourchest.org](http://treasureyourchest.org)

Omrani A, Wakefield-Scurr J, Smith J, Wadey R and Brown N (2020) Breast Education Improves Adolescent Girls' Breast Knowledge, Attitudes to Breasts and Engagement with Positive Breast Habits. *Front. Public Health*8:591927. doi: 10.3389/fpubh.2020.591927

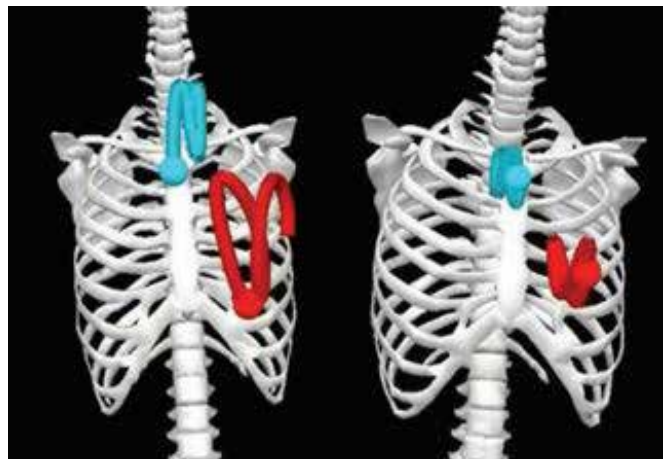
### OUR FIRST UNDERSTANDING OF THE BIOMECHANICS OF IMPLANTED BREASTS

WE CONDUCTED A CASE STUDY TO COMPARE THE BREAST POSITION AND MOTION OF IMPLANTED VS. NATURAL BREASTS

Whilst the biomechanics of natural breasts is reasonably well documented, effects of breast implants on breast biomechanics is relatively unknown. The implant itself presents an additional mass that is often added to the breast, which would suggest an increased force, and consequently an increased movement profile. However, breast implants may also increase breast skin tension and interact with surrounding tissues altering breast position and motion during dynamic activity.

We were interested to hear about a reduced mass implant (30% lighter than a standard mass implant) and wanted to understand the differences in breast biomechanics of breasts augmented with reduced-mass implants during standing, walking, and running, compared with natural breasts.

Two participants with reduced mass breast implants and two participants with natural breasts took part in our study. The participants with the reduced mass implant displayed greater nipple projection and elevation and a 50% reduction in nipple acceleration during walking, when compared with their natural counterparts.



During running, those with the reduced mass implants displayed decreased nipple kinematics compared with their natural counterparts.

We concluded that a combination of implant location (subglandular- behind the breast tissue) and reduced mass, minimised nipple movement during running. Reducing nipple movement during dynamic activity may decrease breast loading, helping to decrease potential breast sag and increase the longevity of implant surgery.

## HOW THE CHARACTERISTICS OF SPORTS BRAS AFFECT THEIR PERFORMANCE

### WE ANALYSED ALMOST 100 SPORTS BRAS AND FOUND FIVE KEY CHARACTERISTICS AFFECTED THEIR PERFORMANCE

Sports bra performance is often measured using breast movement reduction percentage; however limited evidence exists on the sports bra characteristics that affect it.

We investigated the breast movement reduction performance achieved by 98 sports bras during treadmill running. We categorised each sports bra into support levels (Low, Medium and High), and identified the characteristics that contributed to these support levels.

Breast movement reduction ranged from 36% to 74% across the 98 sports bras analysed. The sports bras categorised as Low Support reduced <54% of breast movement. Sports bras in the Medium Support category reduced 54% to 63% of breast movement. High Support sports bras reduced >63% of breast movement.

Following statistical analysis, **five** sports bra characteristics contributed to improved breast movement reduction performance the most:

- **Encapsulation style**
- **Padded cups**
- **Nylon (principle fibre content)**
- **Adjustable underband**
- **High neck drop**

These characteristics explained over a third (37.1%) of breast movement reduction performance.

This original research facilitates high performance sports bra development, and helps inform consumer choice by identifying the performance of sports bras and the characteristics which impact sports bra performance.

Norris, M., Blackmore, T., Horler, B. & Wakefield-Scurr, J., (2020). How the characteristics of sports bras affect performance. Ergonomics, DOI:10.1080/00140139.2020.1829090

## NEW! BRA TESTING PACKAGES

We have been running our scientific bra testing service for over 6 years. During a short break from the laboratory (a worldwide pandemic!) we obtained feedback from industry to refine and evolve what we offer to interested partners.

Still known as the Bronze, Silver and Gold; our bra testing packages are now focusing exclusively on measuring breast biomechanics and participant perceptions to categorise the performance of sports bras or every day bras.

We hold what we believe is the largest bra performance database in the world! We have tested over 3000 women and we rank all of the bras they have worn by the amount of breast movement they control. We are also able to categorise bras as High, Mid or Low Performers when compared to the hundreds of sports bras we have previously tested. Many of the major industry players are using this to understand how their products compare to the rest of the market.

Not only are our partners able to receive vital marketing statistics and recommendations from our researchers, they are also able to display our RGBH tested stamp to show their products have been independently tested by our breast biomechanics experts. For more details please get in contact with us.



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